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10/013,081	12/10/2001	Soo-Kyung Kim	2080-3-56	1470

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EXAMINER

BATTAGLIA, MICHAEL V

ART UNIT

2652

PAPER NUMBER

3

DATE MAILED: 06/04/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/013,081

Applicant(s)

KIM, SOO-KYUNG

Examiner

Michael V Battaglia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 December 2001.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-21 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-21 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 December 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.
3. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-15 and 19-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Novotny et al (hereafter Novotny) (US 6,307,832) in view of Kanaguchi et al (hereafter Kanaguchi) (JP 08235556A). It is noted that the translation of Kanaguchi provided by Japanese Patent Office website will be referenced in the rejections below.

In regard to claim 1, Novotny discloses a near field optical recording device for recording or reproducing information by making a near field light incident on a recording medium, wherein the near field optical recording device comprises a collective lens (Fig. 3A, element 303) and a head slider (Fig. 3A, element 302), where the collective lens is mounted facing near the surface of the recording medium (Figs. 1 and 3A). Novotny does not disclose that an air induction channel is formed extended from an outside to the collective lens at the head slider

Kanaguchi discloses an air induction channel (Fig. 1, element 9) that is formed on the surface of a head slider (Fig. 1, element 7) that is facing near the surface (Fig. 1, element d) of a recording medium (Fig. 1, element D). Kanaguchi teaches that the air induction channel enhances the cooling effect of the head slider, prevents the head from reaching an elevated temperature, and maintains the magnetic properties and recording efficiency of the head (Paragraphs 0043 and 0044).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the head slider of Novotny with the air induction channel of Kanaguchi, the motivation being to enhance the cooling effect of the head slider, prevent the head from reaching an elevated temperature, and maintain the magnetic properties and recording efficiency of the head. It is noted that because the air induction channel of Kanaguchi is formed on the surface of a head slider that is facing near the surface of the recording medium, the air induction channel will extend from an outside to the collective lens of Novotny, which is located at the surface of the head slider that is facing near the surface of the recording medium.

In regard to claim 2, Kanaguchi discloses that at least one air induction channel is formed penetrating the head slider (Fig. 1, element 9).

In regard to claim 3, Kanaguchi discloses that the longitudinal direction of the air induction channel is the same as the rotational direction of the recording medium (Fig. 1, element 9).

In regard to claim 4, Kanaguchi discloses that an air discharge hole is additionally formed at the head slider (Fig. 1, element 9). One of the air induction channels (Fig. 1, element 9) is interpreted as an air discharge hole because air that goes into the channel is discharged from the channel.

In regard to claim 5, Novotny discloses that the collective lens is a solid immersion lens (Fig. 3A, element 303).

In regard to claim 6, Kanaguchi discloses that the air induction channel introduces air flow generated according to the rotation of the recording medium into the head slider (Paragraph 0042).

In regard to claim 7, Novotny discloses a near field optical recording device comprising: a recording medium (Figs. 1, 2 and 4A, element 150) for recording optical information; a first driving unit for rotating the recording medium (Fig. 1, element 160); an optical pick-up unit (Fig. 1, element 101 and Fig. 2, element 20) having a light source (Figs. 1 and 2, element 102) and light modulation unit (Col. 3, lines 53-58); a second driving unit for rotating the optical pick-up unit (Fig. 4A, element 410); a head assembly (Figs. 1, 2 and 4A, element 140) including a head slider (Fig. 3A, element 302) being positioned at an upper surface of the recording medium (Figs. 1 and 3A) and having at least one lens mounted thereon (Fig. 3A, element 303), and a connection unit for connecting the head slider and the optical pick-up unit (Fig. 2, elements 120 and 220). A modulation unit that modulates the output of the light source is inherent for the near field optical recording device to record data that is spatially distributed and stored by a suitable encoding

method. Novotny does not disclose that the head slider has an air induction channel starting from the outside of the head slider to the lens.

Kanaguchi discloses an air induction channel (Fig. 1, element 9) that starts from the outside of a head slider and is formed on the surface of the head slider (Fig. 1, element 7) that is facing near the surface (Fig. 1, element d) of a recording medium (Fig. 1, element D). Kanaguchi teaches that the air induction channel enhances the cooling effect of the head slider, prevents the head from reaching an elevated temperature, and maintains the magnetic properties and recording efficiency of the head (Paragraphs 0043 and 0044).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the head slider of Novotny with the air induction channel of Kanaguchi, the motivation being to enhance the cooling effect of the head slider, prevent the head from reaching an elevated temperature, and maintain the magnetic properties and recording efficiency of the head. It is noted that because the air induction channel of Kanaguchi is formed on the surface of a head slider that is facing near the surface of the recording medium, the air induction channel, which starts from outside the head slider, will extend to the collective lens of Novotny, which is located at the surface of the head slider that is facing near the surface of the recording medium.

In regard to claim 8, Kanaguchi discloses that at least one air induction channel is formed penetrating the head slider (Fig. 1, element 9).

In regard to claim 9, Kanaguchi discloses that at least two air induction channels are formed penetrating the head slider, of which one serves as an air discharge passage (Fig. 1, element 9). One of the air induction channels (Fig. 1, element 9) is interpreted as an air discharge passage because air that goes into the channel is discharged from the channel.

In regard to claim 10, Kanaguchi discloses that the longitudinal direction of the air induction channel is the same as the rotational direction of the recording medium (Fig. 1, element 9).

In regard to claim 11, Novotny discloses that an objective lens (Fig. 3A, element 301) for focussing light generated from the optical pick-up unit (Fig. 1, element 101) and a collective lens (Fig. 3A, element 303) for transmitting the focussed light to the recording medium are mounted at the head slider (Fig. 3A, element 302).

In regard to claim 12, Novotny discloses that the collective lens is a solid immersion lens (Fig. 3A, element 303).

In regard to claim 13, Kanaguchi discloses that an air discharge hole is additionally formed at the head slider (Fig. 1, element 9). One of the air induction channels (Fig. 1, element 9) is interpreted as an air discharge hole because air that goes into the channel is discharged from the channel.

In regard to claim 14, Kanaguchi discloses that the air discharge hole is formed corresponding to the direction of the air induction channel (Fig. 3A, element 9 and Paragraph 0037). It is noted that the air discharge hole and the air induction channel are formed in parallel.

In regard to claim 15, Novotny in view of Kanaguchi as applied to claim 14 does not disclose that the air discharge hole is formed to have a different height as that of the air induction channel.

Kanaguchi discloses an air discharge hole (Figs. 4 and 5, element 32) that is formed at a different height than the air induction channel (Fig. 1, element 9). Kanaguchi teaches that the air discharge hole further increases the surface area of the head slider that receives air flow, which enhances the cooling effect of the head slider, prevents the head from reaching an elevated

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temperature, and maintains the magnetic properties and recording efficiency of the head (Paragraphs 0069 and 0070). It is noted that the air discharge hole discharges the air that enters hole.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the head slider of Novotny in view of Kanaguchi with the air discharge hole of Kanaguchi, the motivation being to enhance the cooling effect of the head slider, prevent the head from reaching an elevated temperature, and maintain the magnetic properties and recording efficiency of the head.

In regard to claim 19, Novotny discloses that the head assembly is positioned in parallel to the rotational direction of the recording medium (Fig. 2, element 140). The position of the head assembly is interpreted to be parallel to the direction of the optical path (Fig. 2, element Optical Path).

In regard to claim 20, Novotny discloses that the head assembly is positioned at a right angle to the rotational direction of the recording medium (Fig. 2, element 140). The position of the head assembly is interpreted to be perpendicular to the direction of the optical path (Fig. 2, element Optical Path).

In regard to claim 21, Kanaguchi discloses that the air induction channel renders the air flow generated according to the rotation of the recording medium to be introduced into the head slider (Paragraph 0042).

5. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Novotny in view of Kanaguchi as applied to claim 13 above, and further in view of Hatam-Tabrizi et al (hereafter Hatam-Tabrizi) (US 6,324,130).

In regard to claim 16, Novotny in view of Kanaguchi as applied to claim 13 does not disclose that the air discharge hole is formed at a right angle to the direction of the air induction channel. It is noted that the air induction channel of Kanaguchi is parallel to the direction of air flow generated by the rotation of the recording medium.

Hatam-Tabrizi discloses an air discharge hole (Figs. 17a and 17b, element 1702) that is formed at a right angle to the direction of the air flow (Fig. 17a, element 1716) generated by the rotation of the recording medium. Hatam-Tabrizi teaches that the air discharge hole assists with damping of the head slider (Col. 8, lines 63-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the head slider of Novotny in view of Kanaguchi with the air discharge hole of Hatam-Tabrizi, the motivation being to provide better damping of the head slider. It is noted that the air discharge hole of Hatam-Tabrizi is formed at a right angle to the direction of the air induction channel of Novotny in view of Kanaguchi due to their respective relation to the direction of air flow generated by the rotation of the recording medium.

In regard to claim 17, Hatam-Tabrizi discloses that the air discharge hole is formed at left and right side faces of the head slider (Fig. 17a, element 1702).

In regard to claim 18, Hatam-Tabrizi discloses that the air discharge hole is formed at an upper face or at a lower face of the head slider (Fig. 17b, element 1702).

Citation of Relevant Prior Art

6. Sugiyama (JP 2001-076362A) discloses an air guiding member of an optical head that cools an objective lens using an air flow generated by rotation of the optical disc and as a result, suppresses the deterioration of the reading and writing signal (Fig. 1). Albrecht et al (US

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6,344,949) discloses a head slider with an air induction channel (Fig. 2). Jordan et al (US 6,529,449) discloses that heating of an optical media in close proximity to the head causes heat damage to the lens (Col. 1). Okabe et al (US 5,343,447) discloses openings and flow guides in a head to circulate an air current generated by rotation of a recording medium to prevent overheating due to temperature increase in field coil (Fig. 1). Brezoczky et al (US 5,351,229) discloses a channel in the support arm of an optical head that extends to a lens (Figs. 5 and 6).

Conclusion

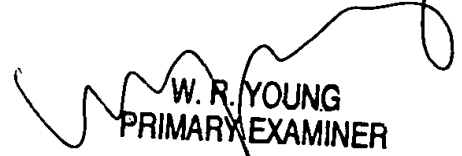
Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (703) 305-4534. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael Battaglia



W. R. YOUNG
PRIMARY EXAMINER